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NEWSLETTER

JANUARY 1989



Spala

Fire Blight

Kherakhon

Paronpest

Feuerbrand

Bacterievuur

Feu Bacterien

Fuego Bacteriano

Zaraza Ogniowa

Lafha Nareya

Vaktiriako Kapsimo

Paerebrann

Ildsot

INTERNATIONAL WORKING GROUP

ON FIRE BLIGHT RESEARCH

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ON
FIRE BLIGHT RESEARCH

NEWSLETTER

from the

Plant Protection Commission
International Society for Horticultural Science

in cooperation with

U.S. Deciduous Tree Fruit Disease Workers

and

European & Mediterranean Plant Protection Organization

JANUARY 1989

United States Department of Agriculture
Agricultural Research Service

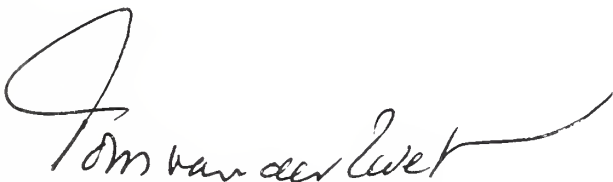
Appalachian Fruit Research Station
Kearneysville, West Virginia, USA

Letter from the Editor

During 1988, news was received from Dr. Saad (while on sabbatical in Jordan) that fire blight was observed in Lebanon. Only rumors have it that the disease has also occurred in Yugoslavia, Romania, Syria, and Turkey. None of these would be unexpected news considering the proximity of these countries to those with fire blight.

There are still some major pome fruit producing countries (i.e. Italy, Australia, and South Africa) where fire blight has not occurred.

Incidentally, it would be of real interest to all blight epidemiologists to have Richard Grimm reveal the secret how he keeps the bacterium from jumping across Lake Constance (Bodensee) into Switzerland. Fire blight has been reported all along the north shore of the lake and throughout the southeastern region of West Germany.

A handwritten signature in cursive script, reading "Tom van der Zwet". The signature is fluid and extends to the right with a long horizontal stroke.

TOM VAN DER ZWET, Secretary
North American Section
International Working Group
on Fire Blight Research



Four well known workshop participants (from countries without fire blight)
at the 4th International Fire Blight Workshop in Ithaca, New York
(June/1985): (left to right)

Dr. S. Wimalajeewa	Australia
Dr. Carlo Bassi	Italy
Dr. Martin Hattinph	South Africa
Dr. Richard Grimm	Switzerland

PRESENT STATUS AND NEW OCCURRENCES OF FIRE BLIGHTCALIFORNIA

Fire blight has emerged as the most serious threat to the production of Asian pears in the San Joaquin Valley in California. Currently 4500 acres of Asian pears are being grown in California. Dr. James A. Beutel, Extension Pomologist, University of California Cooperative Extension Service, has observed that the wood of a tree may be killed down to the trunk in a week's time. Streptomycin and Terramycin are used as controls, twice weekly, with resistance to streptomycin documented (Renn, L., Balancing Asian Pears, Agribusiness Fieldman, February 1989, p. 2-3).

In the traditional European pear areas of California, blight was relatively severe in the Sacramento Delta growing region and in earlier blooming orchards in the upper Sacramento Valley. Rainfall occurred following an extended warm period in which an early full bloom was prolonged because of poor winter chilling. A few main bloom infections provided inoculum during later periods of rain and many rattail infections resulted. Some of the heaviest numbers of postharvest rattail infections seen in 17 seasons developed later in the fall in some of these blocks.

In the mountain districts, blight was severe only in some orchards which were untreated in 1988, because of depressed economic conditions and loss of crop to frost. Treated blocks experienced very little infection.

Broc Zoller
Yuba City

Most areas of California had little or no blight on pear except for shoot blight which occurred mid-June in Sacramento valley. Considerable blight on apple in San Joaquin valley.

Steve Lindow
Berkeley

ILLINOIS

Unusual blight situation in 1988. In spite of the most severe drought in 40 years, blight was present in central Illinois in unexpectedly high amounts (numerous strikes/tree). Infection appears to have occurred in the absence of a wetting period (not even a dew period) and probably coincided with severe windstorms on either May 14 or May 16. Disease was apparent 2-3 weeks later. A secondary cycle did not occur.

Steve Ries
Urbana

MICHIGAN

Fire blight was a minor problem on apple and pear in 1988.

Alan Jones
East Lansing

NEW YORK

Very little fire blight was reported in western New York during 1988. The weather was extremely dry.

Low incidence of fire blight on apples and pears was noted in most Hudson Valley (NY) fruit areas in 1988. In many cases, growers did not notice any blossom blight, but a small number of terminal infections were found scattered through the orchards in mid to late June. Sucking insects are the suspected dispersal agents for this late-developing terminal blight in orchards with noticeable blossom blight.

OREGON

1988 was a mild year for fire blight in the Oregon pear orchards, although the Washington side of the mid-Columbia region experienced severe infection. Bloom was early and temperatures were cool during most of the bloom period. In the severely affected area, temperatures were higher during the bloom. 'Red Clapp', 'Bosc', and 'Red Bartlett' were most blighted cultivars. Experimental plots using plant growth regulator paclobutrazol (PP-333) appeared to have more strikes and greater loss of canopy after cutting than in adjacent plots.

Dave Sugar
Medford

SOUTH CAROLINA

1988 was an average fire blight year (it occurred, but did not devastate any grower or region). The frequency of occurrences is increasing due to increased planting of varieties with greater susceptibility.

Walker Miller
Clemson

UTAH

Fire blight was serious on 'Jonathon', 'Rome', and 'Granny Smith' varieties in Utah County. The outbreak was initiated by warm weather during bloom which resulted in some primary infections in flowers, followed by thunder showers. Secondary infections were common in shoot tips.

Sherm Thomson
Logan

WASHINGTON

Temperatures in Washington during primary bloom of pear were unseasonably high and for the first time in at least 25 years a major fire blight outbreak occurred on primary bloom. Shortly after bloom, temperatures dropped back to normal and symptoms did not appear for several weeks. The problem was compounded by Streptomycin resistance in the affected district (the northernmost portion of the lower Yakima River Valley). While not confined to 'Bosc', the most severe losses occurred on this variety with growers who neglected to do their cutting and lost their entire pear orchards.

Ron Covey
Wenatchee

WEST VIRGINIA

In 1988, the weather was not favorable for blossom blight development with average temperatures below 60°F except for 3 days during the bloom period. However, artificial inoculation with 50 μ l of 10^5 CFU/ml per blossom did result in blight symptoms under these weather conditions.

ALBERTA

- a) Fire blight - extension on backyard raspberry
 - 1) loss of flowers (very poor yield)
 - 2) loss of new canes - shoot blight
 - 3) susceptible variety - 'Boyne' (raspberry) (red berry)
- b) Other raspberry - Rocky Mountain (gold berry) growing side-by-side - not affected
- c) Range of apple cultivars ('Rescue', 'Westland', 'Quinte', etc.) - no damage from fire blight - surrounded by infected raspberry ('Boyne'). Raspberry fire blight - a separate race or strain! Attempts to isolate the fire blight in November of 1988 were unsuccessful - left it too late - by this time affected shoots had been dead for some months.

Ieuan Evans
Edmonton

BRITISH COLUMBIA

Fire blight was moderately severe at certain locations in the Okanagan Valley in 1988. Wet weather combined with mild temperatures in late May and June led to outbreaks, primarily on pear, at Summerland, Penticton, and Westbank, B.C. Pathogenic Erwinia amylovora was isolated from a 3 year old 'Jonagold' apple tree for the first time in this area.

Peter Sholberg
Summerland

NOVA SCOTIA

Fire blight was again present on apple in the Tupperville area of the Annapolis Valley. It appears to be restricted to a few orchards where it has occurred for several years. Blossom blight, which is typically not observed here, was not present even though warmer and wetter periods than usual occurred during the spring. Twig blight, however, was prevalent on susceptible apple cultivars in one orchard but not on pear.

Gordon Braun
Kentville

ONTARIO

The traditional area for fire blight in Essex and Kent counties had very little disease in the spring and summer of 1988. The weather was abnormally dry and warm for most of the bloom and early growing period of apples and pears. Some fire blight was observed on 'Red Delicious' blossoms in an orchard where more susceptible cultivars were also present, but free of the disease.

Warm, dry weather also precluded disease in the mid-Ontario county of Norfolk, except in one orchard where overhead irrigation led to disease problems with both fire blight and blister spot of 'Mutsu'.

In the Niagara region of Ontario, fire blight caused serious problems in pear orchards. Weather conditions were generally warm and very dry during the bloom period and thereafter. Disease spread was common under these conditions and pruning out strikes did not prevent further spread. These problems were even present in well managed sites where fire blight incidence was low in previous years.

Gordon Bonn
Harrow

SASKATCHEWAN

Fire blight has been a minor factor in our orchards for the last few years; however, it has been a serious problem in the past. We are not sure why this change has occurred.

The local Sorbus population, that was rapidly succumbing to a virulent fire blight organism, is now suffering very few losses. Some trees that were infected at that time are now stable.

Rick Sawatsky
Saskatoon

MEXICO

In Mexico, fire blight has been reported until now in the states of Mexico, Chihuahua, Durango, Puebla, and Michoacan.

Fire blight has been identified on Pyracanthus in the state of Mexico, Montecillos area.

Leopold Fucikovsky
Montecillos

BELGIUM

Not many problems on pears in 1988. We had a light night frost (-7°C) during primary blossom. Serious primary blossom infections on the very late flowering apple varieties like 'Court-Pendu' and Reinette de France'.

CYPRUS

During 1988, the fire blight situation generally presents stability, although slight expansion was observed in a few mountainous areas of Limassol, Nicosia, and Paphos districts (Kyperounta, Kato Amiantos, Agros, Pelentri and others), where the infection was more severe than the previous year and new orchards were also infected.

Under the provisions of the Project for the Replacement of the blight susceptible pear and apple cultivars, put in force in October 1986, during 1988 about 8,300 severely infected pear and apple trees were uprooted. An amount of 19,000 (\$133,000) was paid to the farms as subsidies for the uprooting and re-planting of more resistant varieties or other fruit tree species.

Maria Dimova
Nicosia

CZECHOSLOVAKIA

Following the first discovery of fire blight in Czechoslovakia in 1986, (in the territory of Prague City), a nationwide survey was undertaken in 1987 and 1988 seasons. During 1988, new fire blight outbreaks were found at 136 sites. The survey showed that the disease is presently distributed in the central and northwest part of Bohemia (in the territory of districts 9 and 3, respectively).

Although fire blight is now more widespread than in the previous two years, it is by no means common on susceptible hosts. The plants affected were species of Crataegus (92%), Pyrus (4%), Malus, Cotoneaster, Cydonia, and Chaenomeles (1% each). Both blossom and shoot infections were observed. In one case the disease occurred in a pear nursery. Fortunately, it was not found in intensive apple or pear orchards.

The weather conditions, mild winter and frequent intense hailstorms, favored build up of inoculum and spread of fire blight bacteria. All known diseased host plants were eradicated.

Vaclav Kudela
Prague

DENMARK

No change in the situation in Denmark.

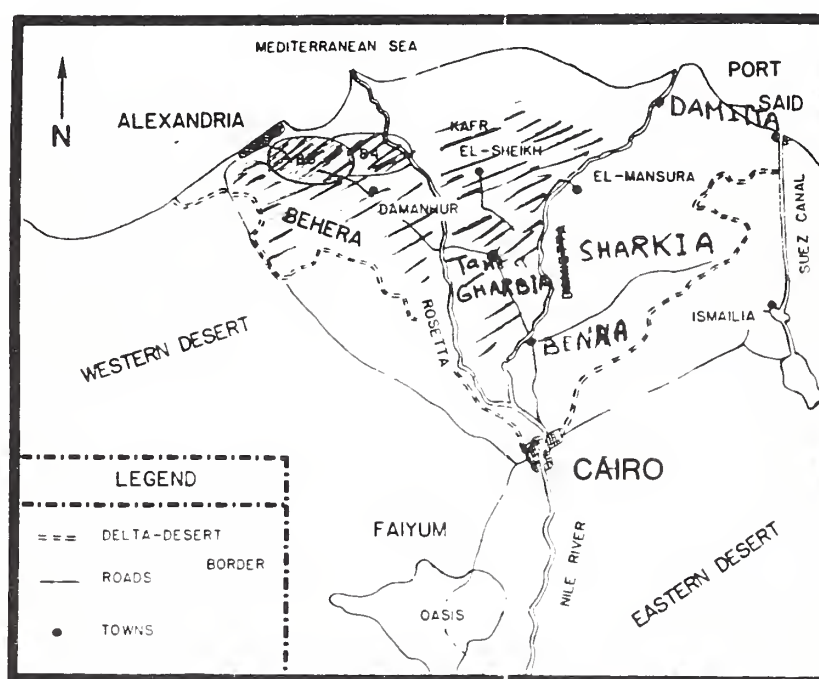
G. Dinesen
Lyngby

EGYPT

In regards to wide spread of fire blight disease in the Nile Delta, all pear orchards located in Behera, Gharbia, Kafr El-Sheikh Governorates, which include the major pear areas in Egypt, i.e. 9607, 1705, and 818 feddans, respectively, out of about 16000 feddans (total pear area in Egypt) were seriously infected with E. amylovora.

According to the available information from the Institute of Horticulture, Ministry of Agriculture, the disease has not been detected yet in Faiyum.

In the coming spring season, I plan to survey the disease all over the country and I will be in touch with you.



M.K. El-Kazzaz
Kafr El-Sheikh

Sudden severe outbreaks of fire blight on pears took place in Alexandria and Behera provinces from 1982 to the present season. The disease also has reached orchards in Kafr El-Sheikh and Gharbia provinces during the 1986 season.

The use of different copper compounds as sprays during the blossom period completely failed to control the disease in Egypt. A small number of growers through the years 1983 to 1986, employed streptomycin sulfate (100 - 120 ug/ml) during the blossom period at 4 day intervals, but the results were not conclusive. However, streptomycin was widely applied in the orchards at Alexandria and Behera provinces during 1983 season and satisfactory control was demonstrated.

During May 1986, strains of Erwinia amylovora resistant to streptomycin were found in Egypt. Two isolates out of 172 isolates collected from different orchards showed resistance to streptomycin (El-Goorani and El-Kasheir 1987, 1988). However, a survey of the occurrence of strains of E. amylovora resistant to streptomycin in certain Egyptian pear orchards was carried out during April and May 1988. Twenty two of 604 isolates collected from 11 orchards showed resistance to streptomycin. The occurrence of streptomycin resistant strains of E. amylovora is still limited and the population of resistant strains was at relatively low level. However, such occurrence of E. amylovora with resistance to streptomycin is a potentially serious situation. The extensive use of streptomycin may result in an increase of resistant strains due to selectivity for these strains.

M.A. El-Goorani
Alexandria

ENGLAND

Some perry pear cultivars have not shown symptoms this past season and so the information may be from an outbreak between 1984 and 1988, but it is still relevant.

The cider apple susceptibility I have shown on the separate table, the cultivars listed are only those which we grow in our own orchards.

While this is a fairly comprehensive list and probably covers all the major varieties currently grown in younger commercial orchards there are, of course, many others in old private farm orchards where we have no knowledge of any fire blight incidence. I have checked this list and my ratings with Ray Williams at the Long Ashton Research Station and we agree on the ratings.

Perry pears, at least in the cultivars which we have in England, are not grown elsewhere to the best of my knowledge. I have seen old (80-100 years) pear trees in orchards in both France and Switzerland and know that many of these are of cultivars used specifically for juicing.

1988 Fire Blight Susceptibility
Showerings Limited, Somerset, England

The perry pear varieties we grow are the following and I have indicated their fire blight susceptibility on a 0-5 scale, so far as we know at present.

	<u>Early harvesting:</u>	<u>1982</u>	<u>1984</u>	<u>1988</u> ^{1/}
*	Thorn	1	1	9
*	<u>Judge Amphlett</u>	5	5	1
*	Taynton Squash	1	1	7
*	Moorcroft	3	3	1
	<u>Theillersbirne</u> (of Swiss origin)	not noted	4	5
*	<u>Hellen's Early</u>	0-1	0	10

	<u>Maincrop:</u>			
*	Hendre Huffcap	3	3	7
*	Red Pear	2	0	9
*	Barnet	5	5	3
*	<u>Winnal's Longdon</u>	4	2	7
	Newbridge	4	3	6
	<u>Oldfield</u>	not noted	5	3
	<u>Rock</u>	not noted	not noted	8
	Yellow Huffcap	1	1	10
	Brandy	1	3	7
	Green Horse	2	3	8
	Pine	not noted	0	9
	Red Longdon	not noted	0	10
	Brown Bess	2	0	10
	Gin	4	3	4
	<u>Wasserbirne</u> (of Swiss origin)	not noted	2	8
	<u>Blakeney Red</u>	5	1	3

	<u>Late harvesting:</u>			
*	Butt	1	1	4

^{1/} USDA fire blight scale: 10 = no blight, 9-8 = 1-6%, 7-6 = 7-25%, and 5-2 = 26-99% blight and 1 = tree dead from blight.

* Indicates a major acreage variety.
Underlined cultivars have either completely disappeared or are reduced to a very low tree number.

Apparent Fire Blight Resistance in Cider Apple Cultivars

<u>CULTIVAR NAME</u>	<u>RESISTANCE SCALE^{1/}</u>
Taylor's Sweet	9
Nehou	9
Tremlett's Bitter	7
Breakwell's Seedling	7
Somerset Redstreak	8
Michelin	8
Sweet Coppin	8
Dabinett	8
Harry Master's Jersey	8
Chisel Jersey	3
Brown Snout	3
Dunkerton's Sweet	9
Vilberie	3
Stoke Red	8
Yarlington Mill	
Stembridge Jersey	3
Coat Jersey	9
Improved Dove	9
Bulmer's Norman	9

^{1/} See table for perry pears.

Geoffrey Rowson
Showerings Ltd.

In 1988 the climate was again not favorable for fire blight. There were few cases notified in the southeast although the disease was observed on some fruit and ornamental hosts in late July and August.

In the southwest, there was a continuing loss of 30 year old perry pears (cvs. Butt, Gin, and Newbridge, about 50 trees total) the infection progressing from holdover cankers in the upper branches. There were many strikes on cider apple Vilberie at one location where warm temperatures were noted in the first two days of bloom.

Fire blight risk assessment. Revisions to Billing's system.

My own experience and that of others in Europe and Canada suggested that the precision of my original system (BOS) needed to be improved.

I decided to go back to first principles, not to attempt minor changes. Fortunately, at this time (1987) Schouten in the Netherlands drew attention to an error in my table of PD values (potential daily doublings of the pathogen) and I recommend change to his table of values (SPD) up to, but not beyond 30°C. When SPD values are used, the spring modification is no longer necessary and, indeed, should not be used. The rain scoring method has been slightly modified to take account of very warm days; there is probably scope for further improvement.

The infection risk scoring method has been completely revised; it is based on experience on a variety of climatic areas. There is new guidance on judging risks of spread by insects during bloom, but this remains tentative.

It seemed premature to introduce a new equation for calculating D-period length (note the change from I-period to avoid confusion with fungal disease "infection periods"). D-period calculations are no longer started in cool wet weather so the number of lines on graphs is much reduced. As a result of all the changes, the graphical presentation is much simpler and use of the system for risk assessments and timing of sprays and searches easier. Users prefer the revised system (BRS) to BOS. Some people will find scope for further improvement or prefer alternative approaches.

I delayed publication of details of BRS until I had studied cases from a wide variety of climatic areas in Europe and USA. To help achieve this, I supplied details of revisions to interested people and worked sample seasons for them using their weather and blossom data (to give them guidance, not for publication by me). As a result, I have introduced simple changes which are particularly useful in warm, semi-arid areas.

As with BOS, BRS must be used in conjunction with local field data, but no scoring method for the latter is proposed.

Eve Billing
Horsmonden

Fire Blight in Northern Ireland

Ireland, both North and South is still regarded as being a fire blight free area. However, during the 1985/86 season, Erwinia amylovora was detected on symptomless, imported plants. During the summer of 1986, fire blight was diagnosed on a number of plants growing in Northern Ireland. The majority of these were immature, recently planted specimens. In 1987, there were only two confirmed outbreaks. In 1988, there were significantly more, some of which involved semi-mature plants.

A strict program of eradication has been carried out and a proportion of imported plants are tested for contamination with E. amylovora.

Connie Garrett
East Malling

FRANCE

Fire blight remains common on the western half of the country both in orchards (pears) and ornamentals. The disease has been only locally destructive (Garonne Valley).

New detection: in Brittany on ornamentals in October 1988. No other extension of the disease in the country.

Jean Pierre Paulin
Angers

GERMANY (East)

Because of the weather conditions we had in 1988, no severe outbreak of fire blight (spring: frost during the flowering period; spring/summer: dry conditions).

Helmut Kleinhempel
Aschersleben

GERMANY (West)

In the northern part of Germany (North-Rhine-area), there was only a low incidence of the disease because of very dry weather during blossom time of the main host plants. Only hawthorn-hedges and some ornamentals in the Cotoneasters showed weak shoot symptoms

In 1987, the first outbreak of fire blight was detected in Saarland on Cotoneaster. In 1988, an increase of attacked host plants (Cotoneaster, Crataegus, pear, apple) was found in private gardens. In both years, humid, warm weather conditions were prevalent. In the area of South Hessen, after a hailstorm, pome fruits mainly in private gardens and again perry pears in the landscape (variety 'Mollenbusch') showed infections.

In the South (Rheinland-Pfalz), a severe outbreak occurred after a hailstorm in June in apple orchards mainly with the varieties 'James Grieve', 'Gloster', 'Golden Delicious', 'Alkmene', 'White Transparent', so that ca. 1 ha had to be eradicated. Moreover, two pear orchards ('Clapps', 'Gute Luise') and quinces in housegardens were attacked (area Rheinhessen). For the first time hawthorn hedges showed massive infections; moreover Cotoneaster salicifolius plants were infected. Mostly blossom and shoot infections with ooze-production occurred in hawthorn and fruit trees.

In the other Southern county, Baden-Württemberg, through favourable weather conditions from May to August, especially in the area of Stuttgart and South Baden, a high incidence of fire blight was observed. Besides the ornamentals Crataegus monogyna, Cotoneaster salicifolius, and in one case Sorbus aucuparia, also some fruits in orchards were attacked (quinces, pears, and apples).

Wolfgang Zeller
Dossenheim/Heidelberg

GREECE

Fire blight was again a serious problem for some areas in Greece, especially for the susceptible pear varieties 'Passa-crassana', 'Kontoula', and 'Santa Maria'. Extremely heavy damages were observed on the 'Kontoula' variety in the area of Korinth where 300 stremmas (30 h) out of 450 stremmas have been uprooted because of severe infection by Erwinia amylovora.

The disease was found in some new areas of Greece: (Island of Kithnos, and Halkidiki, Thesprotia and Trikala districts). Probably, the disease occurred in these areas the previous year, 1987, but was not recorded because of mild infections. Blossom and shoot infections occurred. The weather conditions were favorable for disease development (optimum temperature and rain during bloom). The 'Krystali' variety exhibited considerable degree of resistance (many trees infected the previous year survived) while infected trees of the varieties 'Kontoula', 'Passa-crassana', and 'Santa Maria' were destroyed. Up to now 3.000 stremmas (300 h) of pears have been uprooted all over Greece in an effort to control the disease.

Peter Psallidas
Athens

IRELAND

During 1988, fire blight was found at 20 sites in the Dublin area, at two sites in Co. Wicklow and on one plant at one site in Co. Clare. The host plants were species of Cotoneaster (48 per cent), Pyracantha (28 per cent), Sorbus (16 per cent), Crataegus (4 per cent), and Pyrus (4 per cent).

Patrick Walsh
Dublin

ISRAEL

Fire blight caused heavy losses in 4 pear orchards in a new region: the Northern Coastal Plain-Western Galilea. These orchards were not treated with streptomycin. The disease was not detected in most pear orchards which were infected in 1985-1987 and were treated with 3-4 sprays of streptomycin. Apple and quince orchards infected with fire blight in previous years were also treated with streptomycin and the disease was not detected in 1988.

Firestop (MBR 10995, flumequince), S-0208 and Copac E., compared to streptomycin gave adequate protection in a bactericides test. Firestop was also tested in two non-infected orchards: 1) Apple in the Golan Heights (cv. 'Jonathan', 'Starking', 'Golden Delicious', and 'Granny Smith'); 2) Pear orchard in the Jezrael Valley (cv. 'Costia', 'Spatona', and 'Gentile'). In these two orchards, Firestop was added to the fungicide flusilazole tested against apple and pear scab. No phytotoxicity or any adverse effects, or fruit russetting were observed in any of the treatments.

LEBANON

Last July 1988, just before starting my leave, I received a disease sample of pear, from near the city of Baalbeck, situated in the northeastern part of Lebanon, with typical and severe fire blight symptoms. E. amylovora was isolated on NA plus 5% sucrose medium, from surface disinfested diseased tissues, in our plant pathology lab at American University Beirut.

Due to the unpredictable security situations in Lebanon, I could not carry out a survey of this disease before or after receiving the specimen. I have no idea about the incidence, distribution, or host range of the disease in Lebanon. I am interested in studying this disease and hope to be able to do so during the summer of 1989.

Adib Saad
Beirut
(temp. in Irbid, Jordan)

NORWAY

The eradication program started in 1986 after the first outbreak of fire blight in Norway was continued in 1988. The disease is still confined to the same area, and except for one incidence on apple (shoot infection), the only affected hosts were Cotoneaster spp., particularly the broad leaved species.

Arild Sletten
AAS

POLAND

The disease has not been recorded in new regions of the country. On the seacoast it occurred on a mild level mainly on wild growing hawthorns and sporadically in apple and pear orchards. In the center of the country its activity in some places was more severe, especially in apple orchards.

Piotr Sobiczewski
Skierniewice

SWEDEN

In late 1986, Sweden had an outbreak of fire blight in one orchard close to Simrishamn. We have tried to get rid of fire blight in that orchard by eradicating attacked trees, but we have not been successful. This summer (1988), about 150 trees of pear have been attacked. The situation in the region around the orchard (a heavy fruit growing area) has been investigated in very intense surveys both in 1987 and 1988. So far, fire blight has not been found at any other place in the region. In the orchard, fire blight has only attacked pear and Crataegus. In December 1988, all pear trees in the orchard that were left (more than 2000) were eradicated. The bushes of Crataegus were eradicated in 1986. The grower was allowed to keep his apple trees and even planted new ones where pear trees were eradicated.

In 1988, we discovered a new single place with fire blight in another region (the second location of fire blight in Sweden). Fire blight has attacked bushes of Crataegus close to Ystad and not more than 50 meters from the Baltic Sea. The distance to the first location is about 40 km. It seems more likely that the bacteria were transported by wind from south, either from Denmark, Germany, or Poland than from the orchard outside Simrishamn. Attacked Crataegus and those in the close surrounding have been eradicated. There is no fruit grown in this area.

Magnus Karltorp
Jonkoping

ITALY

Fire blight has not been detected and/or reported in Italy.

Carlo Bazzi
Bologna

SWITZERLAND

Once more, (may be the last year?) no fire blight was detected yet in Switzerland.

Richard Grimm
Wädenswil

CHINA (P.R.)

There is no confirmed record of fire blight in China. We still pay lots of attention to this disease, because its's so important for the quarantine point of view in China. In 1986, I went to the UK and met Drs. Garratt, Lilliot, Billing, and Ebbels when I paid a visit to East Malling, Harpenden, etc.

One of my assistants worked one year in the State University of New Jersey, Rutgers, on the production of monoclonal antibodies for fire blight. Here in China we have tested many imported Rosaceous seedlings and cuttings every year with different methods. We have also paid attention to phage technique and isoelectric focusing for fire blight. Besides we've planned to produce MCA of fireblight in China and attend the Belgium meeting this year. By those efforts we hope we can keep this disease out of China as long as possible. So the newsletter will be extremely useful and important to us.

Zhi-Yong Zhang
Beijing



The five Appalachian Fire Blightketeers from the four states in the mid-Atlantic region: (left to right)

Joe Barrat
Keith Yoder
Tom van der Ligt
Ken Hicke
Paul Steing

West Virginia
Virginia
USDA-AFRS, West Virginia
Pennsylvania
Maryland

DETAILS ON CURRENT FIRE BLIGHT RESEARCH REPORTED FROM
UNIVERSITIES AND EXPERIMENT STATIONS

CALIFORNIA

Experimental use permit is being sought for Pseudomonas fluorescens strain A506 which is naturally resistant to both streptomycin and terramycin and which is a vigorous colonizer of pear for use in integrated control of fire blight and frost injury.

Steven Lindow
Univ. of California

MICHIGAN

Fire blight research projects discontinued with the retirement of E.J. Klos. If the tree fruit position is refilled with a bacteriologist, the project will probably be reactivated.

Alan Jones
Mich. State Univ.

SOUTH CAROLINA

Enjoyed an interesting tour in Japan with the Deciduous Fruit Workers. There are many varieties of apples and Asian pears that are or will be introduced to the United States. We lack adequate information on their relative susceptibility to fire blight.

Walker Miller
Clemson Univ.

CYPRUS

The Sumitomo product S-208 (20% WP at the rate of 150 g/100 l) gave the best blossom protection of pears, followed by Flemequine A (15% suspension at the rate of 2 l/ha or 8cc/tree) in comparison with Copac E (at the rate of 7 l/ha or 23cc/tree) in a field trial together with the other recommended cultural practices.

Maria Dimova
Dept. of Aric.

ENGLAND

New Projects: University of Bath.

- 1) Host - induced pathogenicity genes of Erwinia amylovora (commenced Nov. 1988).
- 2) Mechanisms and selection for resistance to Erwinia amylovora (to start Oct. 1989).

Research Programs - Plant Pathology Res. Division (N. Ireland). The survival of E. amylovora on host and non-host leaves and its interaction with other phylloplane bacteria is under investigation. The potential risk of fire blight being a major problem in Ireland is being assessed on weather data.

Detection methods are being improved. A DNA probe for E. amylovora has been developed and is currently being assessed.

David Stead (Plant Pathology Laboratory, Harpenden) reports that fatty acid profiling of E. amylovora has shown that FAME determinations are useful, but not infallible. About 90% (of 50 isolates) were correctly assigned to E. amylovora, but there was some overlapping with E. rhapontia and to a lesser extent with E. herbicola.

At East Malling (R. Morgan, A. Donovan) about 1/5 of plants derived from apple somaclones regenerated from leaf discs have shown increased resistance to fire blight. The most promising are being intensively screened.

Connie Garrett
Inst. of Hort. Res.

FRANCE

From E. Chevreau:

In cooperation with the pathology team, a new project of in vitro mutagenesis aimed at the obtention of less susceptible pear mutants started in 1988 at INRA-Angers. Studies on in vitro adventitious regeneration from leaf discs and on in vitro inoculation screening test are simultaneously conducted.

From A. Cadic:

Two Pyracantha varieties resistant to scab and fire blight with high ornamental value were released to trade. Those are:

- P. x Cadrou Saphyr Rouge
- P. x Cadange Saphyr Orange

Jean Pierre Paulin
INRA

GERMANY (West)

Resistance studies on a new sortiment of apple and pears were undertaken on a new test plot near Heidelberg. Moreover, control experiments with new bactericide and plant extracts were started here. The monitoring study in the south of Hessen was carried on and a composting experiment for the eradication of disease plant material began in cooperation with colleagues at the University of Kassel.

Another genetic project is the investigation of virulence factors of Erwinia amylovora required for the development of fire blight; removal of a common 29Kb Plasmid results in retardation of disease symptoms. Transposon insertions can produce totally apathogenic strains. Those mutants were classified and studied for specific bacterial defects.

Wolfgang Zeller
Biol. Bundesanstalt

GREECE

The study of climatic data of some selected areas where fire blight has occurred was continued in order to develop a predictive system for fire blight outbreaks under the conditions prevailing in Greece. The study of the characteristics of Greek isolates of Erwinia amylovora is continued.

Preliminary experiments for chemical control of Erwinia amylovora were performed by Dr. Tsiantos in an experimental plot; and a study of the behaviour of Greek apple and pear varieties is to be established in the Magnessia district

A research project for the development of new pear hybrids and varieties resistant to fire blight is under way at the Institute of Desiduous Fruit Trees of Naoussa.

Control experiments have been set up by Dr. Tsiantos, Prof. Panagopoulos, and a private firm selling agricultural chemicals. Known bactericides (copper compounds, antibiotics) and new substances (Flumequine, Sumitomo 50208) are tested in different locations of Greece.

Peter Psallidas
Benaki Phytopath. Ins.

POLAND

Prediction of Fire blight - continuation of study with Billing's system and verification of new computer system.

Efficacy of chemicals for control of fire blight - from 10 chemicals tested on pear fruitlets S-0208 /Sumitomo, Japan/ at conc. 0.3% gave best activity. This compound completely protected fruitlets against infection and development of the disease. No phytotoxic effect was observed.

Antagonistic bacteria against Erwinia amylovora - among 245 bacterial isolates obtained in spring from the surface of 28 species of wild growing plants, 18 were active against the pathogen on yeast-mannitol-agar. One of them, Bacillus spp., the most active, produced antibiotic substance in liquid medium. This antibiotic was thermostabile dialysable.

P. Sobiczewski
Res. Inst. of Pomol.

ISRAEL

Dr. Eva Steinberger and Eng. Agr. B. Marçais compared isolates of Erwinia amylovora from Israel and other countries. The results of the project "Differentiation of Erwinia amylovora strains based on restriction fragment length polymorphisms" will be published.

ITALY

Current fire blight projects in Italy are:

- 1) Selection of pear breeding material for fire blight resistance (Istituto Sperimentale per la Frutticoltura in Rome, under the EEC Fire Blight Working Group).
- 2) Phytosanitary checks and analyses on imported host plants following the criteria laid down by the Italian Phytosanitary Legislation (Ministerial Decree, 30 marzo, 1988, n. 147).
- 3) Phytosanitary inspections in Veneto and Friuli-Venezia Giulia Regions near the Yugoslav frontier.

Carlo Bazzi
Istit. Patol. Veget.

SWITZERLAND

No change in fire blight strategy in Switzerland:

- Prohibition of imports of all fire blight host plants (except new varieties by a two years stay in quarantine chamber).
- Severe control on fire blight symptoms in nurseries and orchards.
- Diagnosis and prediction service.

Richard Grimm
Swiss Fed. Res. Sta

MISCELLANEOUS NEWS

Dr. Sherm Thomson attended pre-congress tour of Japan's fruit growing areas prior to meeting in Kyoto, Japan (August 1988).

He also participated in a fire blight workshop in Yakima, Washington sponsored by USDA and the Washington State Tree Fruit Commission (Sept 19-20, 1988).

Alberto Mendoza has been appointed to Centro De Fitopatologia, Colegio De Postgraduados, Montecillos, Mexico, C.P. 56230 as a staff member. He has an interest in Erwinia amylovora.

There is a publication forseen for 1989 from the EEC working group on fire blight "Agrimed". For details, please contact Jean Pierre Paulin (INRA) who is the chairman of this working group.

Dr. Richard Cooper attended an EEC Agrimed Fire Blight Group meeting on Tissue Culture at Valencia, Spain, in October 1988.

East Malling Staff were well represented at the EEC Agrimed fire blight group, Dax, France in June (F. Alston, E. Billing, C. Garrett). This coincided with exceptional weather with a 'damaging storm' punctuating the talk by Eve Billing.

Mark Wilson has been awarded a Miller Fellowship at the University of California to work with Steve Lindow from September 1989.

J. Vanneste is back to Angers after a post-doc with S.V. Beer, Cornell University, Ithaca, New York.

J. Yu, a student at Cornell Univeristy (Plant Pathology) will stay in Angers in 1989 (E. herbicola/E. amylovora).

M. Ride - formerly head of Plant Pathology Research Station (INRA-ANGERS) is to retire in early 1989. (J. Luisetti took the position of director of the Research Station in 1985).

B. Thibault - pear breeder in Angers Plant Breeding Station is due to be retired in Summer 1989. M. Le Lezec will be in charge of pears (in addition with apple varieties).

Dr. P. Psallidas and J. Tsiantos attended the C.E.E. Agrimed Meeting on Fire Blight held in Dax from 16-17 June, 1988. A meeting on climate and fire blight was held in Athens, Greece from 21-22 November, 1988, in the framework of C.E.E. Agrimed. It was attended by Drs. J. Paulin, P. Lecompte, K. Jacqurt, E. Billing, J. Tsiantos, S. Analytis, and P. G. Psallidas.

A two months stage of Miss Annemarie Schwarz, student of plant pathology in Vienna, has taken place in the Wadenswil laboratory.

Drs. Burr, Rosenberger, and Wilcox participated in a week-long tour of Japanese apple orchards, horticultural experiment stations, and symposium on apple diseases in Hirosaki prior to 5th International Congress of Plant Pathology in Kyoto, last August. Tour was organized by Joe Ogawa under auspices of Deciduous Tree Fruit Disease Workers Group, and included 45 people from USA, Canada, and United Kingdom. Japanese arrangements organized by Dr. K. Sawamura, Hirosaki University.

S.V. Beers will spend the months of June and July, 1989, headquartered in Angers, France, under the auspices of a collaborative agreement between Cornell University and INRA, Institut National de la Recherche Agronomique. He expects to work closely with Dr. J.L. Vanneste and J.P. Paulin on Erwinia amylovora.

Professor Emeritus Robert Lamb (Cornell, Geneva) reports that a group of pomologists, plant pathologists and entomologists in the Northeast submitted a proposal and were funded under the Low Impact Sustainable Agriculture (LISA) program. The project deals with Disease Resistant Apples. These people represent Vermont, Massachusetts, New York, New Jersey, and Pennsylvania and are interested in fire blight and other apple diseases. This project is an attempt to make growers and consumers aware of what is available in disease resistant apples and how they can improve apple growing.

Eng. Agr. B. Marcais returned to France, after working on fire blight in Israel for more than a year on an INRA Fellowship.

Dr. E. Shabi attended the meeting of the E.E.C.-Agrimed Fire Blight Working Group in Dax, France, June 1988, as an invited guest.

Dr. E. Shabi presented a paper on "Fire blight in the Eastern Mediterranean" during the 5th International Pear Symposium, Zaragoza, Spain, May 1988.

Dr. D. Zutra, a member on a panel of Bacteriological Diseases of Plants (EPPO), participated in the 2nd meeting (22-24 June, 1988) at Paderborn, West Germany.

Dr. T. van der Zwet attended the Fifth International Pear Symposium (ISHS) in Zaragoza, Spain, May 1988, and presented one poster and two papers on various phases of his fire blight research.

NEW THESES AND DISSERTATIONS

<u>Name</u>	Thesis or Dissertation Title	<u>Univ.</u>	<u>Degree</u>	<u>Year</u>
Mendoza-Herrera, A.	Variabilite de l'agressivite chez <u>Erwinia amylovora</u> .	Rennes	PH.D.	1988
Guinnebretiera M.H.	Caracterisations de mutants d' <u>Erwinia amylovora</u> affectes dans le pouvoir pathogene.	Nantes	D.E.A.	1988
Gouvreur, Ch.	Role de l'alimentation minerale du <u>Pyracantha X mohave</u> sur l'expression de sa sensibilite au feu bacterien.	Rennes	D.E.A.	1988
DeWael, LuVgarde	De honing bij als mogelijke vector van <u>Erwinia amylovora</u> (Burr.) Winslow et al.	Gent	PH.D.	1988
Vitas, D.	Study of <u>in vitro</u> and <u>in vivo</u> inhibition of <u>E. amylovora</u> by different epiphytic bacteria.	Agric. Univ. of Athens	Diploma	1989
Wilson, M.	Epidemiology and Biological control of fire blight of Hawthorn.	Manchester	PH.D. (expected)	1989
Steinbrenner, B.	Study on forecasting models of Heidelberg fire blight.	Manchester	PH.D. (expected)	1990
Bauer, D.W.	Development and Application of Molecular Genetics for the Study of Pathogenicity of <u>Erwinia amylovora</u> .	Cornell	PH.D.	1989

Locations Reporting Availabilty of Cultures
of Erwinia amylovora for Exchange Purposes.

Univ. of Manchester
Dr. H.A.S. Epton

Pyracantha (7 isolates), Cotoneaster
(14), Sorbus (4) and Crataegus (1).

Dept. of Agriculture
Plant Path. Res. Div.
Belfast BT9 5PX

Isolates from northern Ireland.

Laboratory of Bacteriology
Benaki Phytopathological Institute
8 Delta Street, GR-145 61 Kifissia
Athens, Greece

Greek isolates of E. amylovora.

C.F.B.P.: Collection Francaise
de Bacteries Phytopathogenes
L. Gardan - INRA
Angers 49000, France

Specific antisera: SANOFI

Department of Plant Pathology, NYSAES, Cornell University, Geneva, NY
14456, USA. Contact person: J. L. Norelli.

Department of Plant Pathology, Cornell University, Ithaca, NY 14853, USA.
Contact person: S. V. Beer.

USDA, Appalachian Fruit Research Station, 45 Wiltshire Road
Kearneysville, WV 25430, USA. Contact person: T. van der Zwet.

LIST OF PERSONS INTERESTED IN FIRE BLIGHT 1/

<u>Abo-El-Dahab</u> , M. K., Plant Pathology Dept., Faculty of Agric., Univ. of Alexandria, Alexandria, Egypt.(71960)	(1)	EGY
Agriculture Canada, Library Records Division, Ottawa, Ontario K1A 0C5, Canada.	(2)	CND
Aldwinckle, H. S., Department of Plant Pathology, N.Y. State Agric. Expt. Station, Geneva, NY 14456. (315-787-2331)	(1)	USA -- --
Alston, F. H., Fruit Breeding Dept. Inst. of Hortic. Res., East Malling, Maidstone, Kent, ME19 6BJ, England. (0732-843833)	(1)	UK
Arsenijevic, M., Faculty of Agric., Inst. for Plant Prot., V. Vlahovica 2, 21000 Novi Sad, Yugoslavia. (021-58-366)	(3)	YUG
Balavoine, P., Service de la Protection des Vegetaux, Direc. Dept. Agric. et de la Foret, 7 Avenue de Lyon, 73018 Chambéry Cedex, France.(79-690545)	(1)	FR
Bates, J. J., Biological Research Ctr., Imperial Chemicals Inc., P.O. Box 208, Goldsboro, NC 27530. (919-736-3030)	(2)	USA
Baykal, N., Agric. Univ. Ziraat Fakultesi, Fitopatoloji Kursusu, Ankara, Turkey.	(3)	TUR
<u>Bazzi</u> , C., Laboratorio Fitobatter. Ist. Patol. Vegetale, via Fillippo Re 8, 40126 Bologna, Italy. (051-244218).	3)	ITA
<u>Beer</u> , S.V., Department of Plant Pathology, Cornell University, Ithaca, NY 14853. (607-255-7870).	(1)	USA
Bell, R.L., U.S. Department of Agriculture, Appalachian Fruit Research Station, 45 Wiltshire Road, Kearneysville, WV 25430 (304-725-3451, ext. 353).	(1)	USA

1/ Names underlined are contact persons for preparation of fire blight newsletter. Numbers in parentheses following addresses are local telephone numbers, and those in column at right indicate activity or interest in fire blight:

1. Actively engaged in fire blight research;
2. Indirectly interested in fire blight;
3. Interested in fire blight, but located in region where disease is not present;
4. Retired but still interested in fire blight activities.

Bergna, D. A., Estacion Experimental Alto Valle, Casilla de Correo 782, 8332 General Roca, Rio Negro, Argentina. (0941-25017/27/37)	(3)	ARG
Beutel, J. A., Department of Pomology, University of California, Davis, CA 95616. (916-752-0507)	(1)	USA
Biggs, A. R., Agriculture Canada, Research Station, Vineland Station, Ontario LOR 2E0, Canada. (416-562-4113)	(2)	CND
Billing, Eve, 4 Fromandez Drive, Horsmonden, Tonbridge, Kent TN12 8LN, England. (089-272-2807)	(4)	UK
Blakeman, J.P., Plant Path. Res. Div., Dept. of Agric. for Northern Ireland, Newforge Lane, Belfast BT9 5PX, England.	(2)	UK
Bolay, A., Section de Phytopath., Station Federale de Rech. Agron. de Changins, 1260 Nyon, Switzerland. (022-615451)	(3)	SWT
<u>Bonn</u> , W. G., Agriculture Canada, Research Station, Harrow, Ontario NOR 1G0, Canada. (519-738-2251)	(1)	CND
Bouma, A. Sophieke, Research Station for Nursery Stock and Urban Greenery, P.O. Box 118, 2770 AC Boskoop, The Netherlands. (01727-19797).	(1)	NL
<u>Braun</u> , P.G., Agriculture Canada, Research Station, Kentville, Nova Scotia, B4N 1J5, Canada. (902-678-2171).	(2)	CND
Burkowicz, A., Instytut Sadownictwa, 83-111 Milobadz, Poland.	(2)	POL
Bushong, J. W., Microbiology Products, 3M Center, Bldg 225-55-01, 3M Company, St. Paul, MN 55144. (612-733-4758)	(2)	USA
Byrde, R. J. W., Long Ashton Research Station, Bristol BS18 9AF, England. (027-239-2181)	(1)	UK
Cadic, A., Station d'Amelior. des Especies Fruit. et Ornamentales, INRA, Beaucouze 49070 Angers, France. (16-41-73.51.25).	(2)	FR
Calzolari, Alessandra, Osservatorio Malattie Piante, Via di Corticella 135, 40129 Bologna, Italy. (051-352917)	(3)	ITA
Cao, R., Department of Plant Prot., Zhejiang Agric. Univ., Hangzhou, Zhejiang, Peoples Republic of China. (42605).	(3)	CHI
Carrera, M., Dept. Agriculture, Ganaderia y Montes, Serv. Invest. Agaria, Apt. 727, 50080 Zaragoza, Spain.	(3)	SPN
<u>Cartwright</u> , D. N., Plant Quarantine Div., South Austr. Dept. of Agric., Box 1671, G.P.O., Adelaide, South Australia 5001. (08-2660911)	(3)	AUS

Cazelles, O., Station Federale de Recherches Agronomiques de Changins, 1260 Nyon, Switzerland. (022-61.54.51)	(3)	SWT
Centre for Agricultural Publishing and Documentation (PUDOC), P.O. Box 9100, 6700 AA Wageningen, The Netherlands. (08370-84440)	(2)	NL
Chevalier, R., Laboratoires Riker, 3M Sante, Ave. du 11 Novembre, 45312 Pithiviers Cedex, France.	(2)	FR
<u>Chouibani</u> , M., D.P.V.C.T.R.F., B.P. 1308, Rabat, Morocco.	(3)	MOR
Christensen, F. G., The Royal Veterinary and Agricult. Univ. Arboretum, 2970 Horsholm, Denmark. (02-860641)	(2)	DK
Civerolo, E. L., Nat. Prog. Staff, U.S. Department of Agriculture, Room 230, Building 005, BARC-West, Beltsville, MD 20705. (301-344-3915)	(2)	USA
Cline, R. A., Horticulture Research Institute of Ontario, Vineland Station, Ontario LOR 2E0, Canada. (416-562-4141)	(2)	CND
Cooper, R. M., School of Biol. Sciences, Univ. of Bath, Claverton Down, Bath, Avon BA2 7AY, England. (0225-826826)	(1)	UK
Coulombe, L. J., Agriculture Canada, P.O. Box 457, St. Jean, Quebec J3B 6B8, Canada. (514-346-4494)	(2)	CND
<u>Covey</u> , R. P., Tree Fruit Research Center, 1100 North Western Avenue, Wenatchee, WA 98801. (509-663-8181)	(1)	USA
Cummins, J. N., Department of Pomology & Vitic., N.Y. State Agr. Expt. Station, Geneva, NY 14456. (315-787-2233)	(1)	USA
Dalchow, J., Pflanzenschutzdienst, Postfach 930129, Fr. W. von Steuben Str. 2, 6000 Frankfurt 93, W. Germany (069-775051-3)	(1)	BRD
Dale, T., Norwegian Plant Inspection Service, P.O. Box 94, Okern, 0509 Oslo 5, Norway. (47-2648887)	(2)	NOR
Davidson, J. G. N., Agriculture Canada, Research Station, Box 29, Beaverlodge, Alb. T0H 0C0, Canada. (403-354-2212)	(2)	CND
<u>Deckers</u> , T., Opzoekingsstation van Gorsem, Brede Akker 3, 3800 St. Truiden, Belgium. (011-682019)	(1)	BLG
De Ley, J., Lab. voor Microb. en Microb. Genetica, Rijksuniv. Gent, K. L. Ledeganckstr. 35, 9000 Gent, Belgium. (22-78-21)	(1)	BLG
del Solar, C.E. Departamento Frutic., Univ. Catolica de Chile, Moneda 611, Dept. 51, 1 Santiago, Chili. (384200)	(3)	CHL
<u>Dimova</u> , Maria, Plant Protection Section, Department of Agriculture, Nicosia, Cyprus. (21-40-2254).	(2)	CYP

- Dinesen, G., Institute of Plant Pathology, Lottenborgvej 2, (2) DK
2800 Lyngby, Denmark. (0287-2510)
- Douglas, Sharon M., Dept. of Plant Pathology & Ecology, (2) USA
Conn. Agric. Expt. Sta., P.O. Box 1106, New Haven, CN.
06504 (203-789-7222)
- Drewitt, W., New Zealand Apple & Pear Board, Private Bag, (2) NZ
Wellington, New Zealand. (04-731-240)
- Ebbels, D. L. Ministry of Agric. Fish. & Food, Harpenden (2) UK
Lab., Harpenden, Herts AL5 2BD, England. (05827-5241)
- Egolf, D. R., U. S. National Arboretum, 3501 New York Ave., (1) USA
Washington, D.C. 20002. (202-472-9277)
- El-Kazzaz, M. K., Department of Agric. Botany, Faculty (2) EGY
of Agric., Tanta University, Kafr El-Sheikh, Egypt.
- Ellis, M. A., Department of Plant Path., Ohio Agric. Research (1) USA
and Devel. Center, Wooster, Ohio 44691. (216-263-3700)
- El-Said, S., Department of Medical Entomology, Ain Shams Univ., (2) EGY
Cairo, Egypt. (822-030).
- El-Zayat, M.M., Dept. of Agric. Botany & Plant Path., Ain Shams (2) EGY
Univ., Shoubra El-Kheim, Cairo, Egypt. (002022452931)
- Epton, H. A. S., Dept. Cell & Structural Biol. Stopford Bldg., (1) UK
Univ. of Manchester, Oxford Road, Manchester M13 9PT, England.
(061-2753900)
- Ercolani, G. L., Istituto di Microb. Agraria e Tecnica, (3) ITA
Facolta di Agrar., Via Amendola 165/A, 70126 Bari, Italy.
(080-339422)
- Evans, E. J., A.D.A.S., Block A, Government Offices, (1) UK
Coley Park, Reading RG1 6DT, England
- Evans, I. R., Alberta Agriculture, Plant Industry Div., 7000 (2) CAN
113 Street, Edmonton, Alb. T6H 5T6, Canada. (403-427-7098)
- Fahy, P. C., Biological & Chem. Research Institute, NSW (3) AUS
Dept. of Agric. and Fish, P.M.B.10, Rydalmere, NSW
2116, Australia. (02-683-9777)
- Fideghelli, C., Istituto Sperim. Frutticoltura, Via di (3) ITA
Fioranello n. 52, Ciampino Aeroporto, 00040 Rome, Italy.
- Fox, R. T. V., Dept. of Horticulture, Earley Sate, University (2) UK
of Reading. Reading, RG6 2AY, England. (734-875123).
- French, J. R., FMC Corp., 100 Niagara Street, Middleport, NY (2) USA
14105. (716-735-3761, ext. 361)

- Fucikovsky, L., Centro de Fitopatologia, Colegio de Postgraduados, Escuela Nacional de Agricultura, A.P. #85, 56230 Montecillos-Chapingo, Mexico. (595-45211) (2) MEX
- Fujita, K., Aomori Field and Horticultural Expt. Station Gonohe, San-nohe-Gun, Aomori 039-07, Japan. (3) JAP
- Gantotti, B. V., Department of Bacteriology, University of California, Davis, CA 95616. (916-756-0283). (1) USA
- Garrett, Constance (Connie) M. E., Dept. of Plant Pathology, Inst. of Hort. Research, East Malling, Maidstone, Kent, ME19 6BJ, England (0732-843833) (1) UK
- Geenen, J., Rijksstation voor Plantenziekten, Burg. van Gansberghelaan 96, 9220 Merelbeke, Belgium. (091-522083) (2) BLG
- Geider, K., Abtlg. Molekulare Biol., Max Planck Inst. fur Medizin. Forsch., Jahn Str. 29, 6900 Heidelberg, W. Germany. (06203-16761). (1) BRD
- Gessner, E., Inst. fur Pflanzenschutz, Saatgutunter Suchung u. Bienenkunde der Landwirt-Schaftskammer Westf.-Lippe, Nevingoff 40, 4400 Munster, W. Germany. (0251-276669). (1) BRD
- Goodman, R. N., Dept. of Plant Pathology, 3-18 Agric. Bldg., Univ. of Missouri, Columbia, MO 65211. (314-882-7043) (1) USA
- Graf, H., Obstbauversuchsanstalt, Westerminnerweg 22, 2155 Jork, West Germany. (04162-7004) (2) BRD
- Grimm, R., Federal Res. Station for Fruit-growing, Vitic. and Hortic., 8820 Wadenswil, Switzerland. (01-783.6307) (3) SWT
- Gupta, G. K., Fruit Path. Lab., Regional Hort. Res. Station Bajausa, Kullu, H.P. 175125, India. (3) IND
- Hale, C. N., Plant Diseases Div., Dept. of Scient. and Indust. Research, Private Bag, Auckland, New Zealand. (893660) (1) NZ
- Hattingh, M.J., Dept. of Plant Path., Univ. of Stellenbosch, Stellenbosch 7600, South Africa (02231-77798) (3) SA
- Heybroek, H. M., Dorschkamp Research Inst. for Forestry and Landscape Planning, P. O. Box 23, 6700 AA Wageningen, The Netherlands. (08370-95360) (1) NL
- Hickey, K. D., Fruit Research Laboratory, Penn. State Univ., Box 309, Biglerville, PA 17307. (717-677-6116) (2) USA
- Hignett, R. C., & Shernolds, Maidstone, Kent ME15 9QG, England. (0622-44116) (4) UK

- Howard, R. J., Alberta Hort. Res. Center, BAG Service 200, (2) CND
Brooks, Alberta T0J 0J0, Canada. (403-362-3391)
- Hummer, Kim, Curator, USDA, ARS, Nat. Clonal Germpl. Reposit., (1) USA
33447 Peoria Rd., Corvallis, OR 97330. (503-757-4448)
- Hunter, C. L., Plant Industry Branch, Ontario Min. of Agric. (2) CND
and Food, P. O. Box 587, Simcoe, Ontario N3Y 4N5, Canada.
(519-426-7120)
- Ikin, R., Plant Quarant. & Inspect. Branch, Australian Quar. & (3) AUS
Inspect. Serv., Dept. of Primary Industries and Energy,
P.O. Box 858, Canberra Act. 2902, Australia. (062-725533)
- Janick, J., Department of Horticulture, Purdue University, (1) USA
West Lafayette, IN 47907. (317-494-1329).
- Janse, J. D., Plant Protection Serv., Geertjesweg 15, (1) NL
P.O. Box 9102, 6700 HC Wageningen, The Netherlands.
(08370-96300)
- Jones, A. L., Department of Botany & Plant Path., Michigan (1) USA
State Univ., East Lansing, MI 48823. (517-355-4573)
- Jones, D. R., Agricultural Development and Advisory Service, (1) UK
Min. of Agric., Fisheries, and Food, Burghill, Rd.,
Westbury-on-Trym, Bristol BS10 6NJ, England. (0272-591000)
- Joseph, E., Office Federale, de l'Agriculture, (3) SWT
Martenhofstr. 5, 3003 Bern, Switzerland. (031-612565)
- Joshi, M.M., Agric. Products Dept., DuPont Chem. Co., Stine- (2) USA
Haskell Res. Center, Bldg. 200, Newark, DE 19711.
(916-752-0325)
- Kado, C.I., Dept. of Plant Path., Univ. of California, (2) USA
Davis, CA 95616. (916-752-0325)
- Karlton, M. The National Board of Agriculture, 55183 (2) SWD
Jonkoping, Sweden. (46-36-15-50-00)
- Kato, T., Research Department - Pesticides Div., Institute (3) JAP
for Biological Science, Sumitomo Chemical Co., Ltd.,
4-2-1, Takatsukasa, Takarazuka, Hyogo, 665, Japan.
- Keck, Marianne, Bundesanstalt fur Pflanzenschutz, (3) AST
Trunnerstrasse 5, 1020 Vienna, Austria. (0222-24.15.11)
- Kleinhempel, H., Inst. fur Phytopathologie, Akad. Landwirtsch. (1) DDR
Wissensch., Theodor-Roemer-Weg 4, 4320 Aschersleben,
East Germany. (5141)
- Klement, Z., Dept. of Pathophysiology & Disease Resistance, (3) HUN
Plant Protection Institute, Herman Otto u. 15, P.O. 102,
1022 Budapest, Hungary. (358-137)

Knosel, D., Inst. fur Angewandte Botanik, Univ. of Hamburg, Marseiller Str. 7, 2000 Hamburg 36, West Germany. (040-4123-2353)	(1)	BRD
Koenigshof, R., Pear Research Association, Box 4050, Kerlikowske Rd., Coloma, Michigan 49038. (616-849-2375)	(2)	USA
Kooistra, T., Plant Protection Service, Geertjesweg 15, P.O. Box 9102, 6700 HC Wageningen, The Netherlands. (08370-96400)	(1)	NL
Krebs, E.K., Pflanzenschutzamt Hannover, Wunstorfer Str. 9, 3000 Hannover, West Germany. (0511-4005173)	(2)	BRD
Kroeker, G., Swedish Univ. of Agric. Sciences, Box 7036, 75007, Uppsala 7, Sweden. (018-102000)	(2)	SWD
Kudela, V., Institute of Plant Protection, Research Inst. of Crop Production, Ruzyně 507, 16106 Prague 6, Czechoslovakia. (360851-9)	(1)	CZE
Laere, O. van, Research Station for Nematology and Entomology, Burg, van Gansberghelaan 96, 9220 Merelbeke, Belgium. (091-52.20.85)	(1)	BLG
Lamb, R. C., Department of Pomology & Vitic., N. Y. State Agr. Expt. Station, Geneva, NY 14456. (315-787-2235)	(1)	USA
Landis, W. R., Agric. Chem. Development, MSD Agvet Division, P. O. Box 2000, Rahway, NJ 07065. (201-574-6605)	(2)	USA
Larue, P., Service de la Protection des Vegetaux, Lycee Agricole de Dax, B.P.I, Heugas, 40180 Dax, France.	(1)	FR
Lecomte, P., Laboratoire Feu Bacterien (INRA), Lycee Agricole de Dax, B.P. I, Heugas, 40180 Dax, France. (16-58-98.73.11)	(1)	FR
Lehmann-Danzinger, H., Inst. fuer Pflanzenpath. und Pflanzensch., Grisebachstr. 6., 3400 Gottingen, West Germany. (0551-393716)	(1)	BRD
Letal, J., Regional Crops Laboratory, Box 10, Olds, Alberta T0M 1P0, Canada. (403-556-8421)	(2)	CND
Lin, C.P., Dept. of Plant Pathology and Entomology, National Taiwan Univ., Taipei, Taiwan, Rep. of China (ROC)	(3)	TAW
Lindow, S., Dept. of Plant Path., Univ. of California, Berkeley, CA. 94720	(2)	USA
Lombard, P. B., Department of Horticulture, Oregon State University, Corvallis, OR 97331. (503-754-3695)	(2)	USA
Lopes Barardo, R., Delgada, 2540 Bombarral, Portugal. (062-62897)	(3)	POR

Lopez Gonzales, M., Dept. Proteccion Vegetal, I.N.I.A., CRIDA 07, Moncada-Valencia, Spain. (739-1000)	(3)	SPN
Luby, J., Dept. of Horticulture, Univ. of Minnesota, 1970 Folwell Ave., ST. Paul, MN 55108.	(2)	USA
Lux-Wellenhof, E., Ciba-Geigy GmbH, Postfach 11.03.53, 6000 Frankfurt 11, West Germany. (0611-7155.257)	(2)	BRD
Manganaris, A., Pomology Institute, 59200 Naoussa, Greece. (01-0332-41548)	(2)	GRC
Mansergas, A. J. F., Ministerio de Agric., Dept. de Frutic., Apartado 202, Zaragoza, Spain. (976-29 72 07)	(3)	SPN
Mansfield, J.W., Biological Sciences Dept., Wye College, Wye Ashford TN25 5AH, England. (812401-0233)	(2)	UK
Mappes, D., BASF, Agricultural Research Station, P.O. Box 220, 6703 Limburgerhof, West Germany. (6236-682299)	(2)	BRD
Maroquin, C., Station de Phytopathologie de l'Etat, 13 Ave. Marechal Juin, 5800 Gembloux, Belgium. (081-612094 or 612099)	(2)	BLG
<u>Martins</u> , J. M. S., Dept. Fitopatologia, Estacao Agronomica Nacional, 2780 Oeiras, Portugal.	(3)	POR
Massfeller, D., Pflanzenschutzamt der Ldw. Kammer Rheinland, Siebengebirgsstr, 5300 Bonn-3, West Germany. (0228-434150)	(1)	BRD
Mazzucchi, U., Laboratorio Fitobatter., Istituto Patol. Veget. via Filippo Re 8, 40126 Bologna, Italy. (051-236175)	(3)	ITA
McPhee, W. J., Okanagan Similkameen Coop. Growers Assoc., East 9th St., Oliver, BC V0H 1T0 Canada. (604-498-3491)	(2)	CND
Meijneke, C. A. R., Plantsoen 168, 6701 AT Wageningen, The Netherlands. (08370-13228)	(4)	NL
Mendoza, H. A., Centro de Fitopatologia, Colegio de Postgraduados, 56230 Montecillo, Edo. de Mexico, Mexico. (595-4-52-11)	(1)	MEX
<u>Meyer</u> , F. C., Catedra de Fitopat., Facultad de Ciencias Agrarias, Univer. Nacional del Comahue, 8303 Cinco Altos, Argentina.	(3)	ARG
Meyer, J., Amt fur Land-und Wasserwirtschaft, Abteilung Pflanzenschutz, Herzog-Adolf Strasse 1b, 225 Husum, West Germany. (04841-2746)	(1)	BRD

- Michel, H. G., Landesanstalt für Pflanzenschutz,
Reinsburgstr. 107, 7000 Stuttgart - 1, West Germany.
(0711/6676-2575 or 73) (2) BRD
- Michon, P., 3-M, Health Care, 40 Rue Gabriel Crie,
92245 Malakoff Cedex, France. (2) FR
- Mielke, G., Mid-Columbia Expt. Sta., 3005 Expt. Station
Drive, Hood River, OR 97031 (2) USA
- Mikkelsen, Else, The Danish Plant Protect. Service,
Gersonvej 13, 2900 Hellerup, Denmark (01-620787) (2) DK
- Miller, R. W., Dept. of Plant Path. and Physiol., Clemson
Univ., Clemson, SC 29634-0372. (803-656-5732) (2) USA
- Milner, J.S., Medical Sciences Bldg., Microb. Dept., Univ. of
Leicester, Leic., LE1 9HN, England. (Leic. 522-954) (1) UK
- Morton, H. V., Ciba-Geigy Corp., P.O. Box 18300,
Greensboro, NC 27419. (919-292-7100, ext. 2756) (2) USA
- Mosegaard, J., Dansk Plantekeleejer Forening, Elmedals
Allee 33, 5250 Fruens Bøge, Denmark. (2) DK
- Muir, J., Alberta Agriculture, Crop Protection Lab.,
P.O. Box 7777, Fairview, Alberta, T0H 1L0, Canada. (2) CAN
- Nishio, T., Yokohama Plant Protec. Sta., Min. of Agric.
Forest. and Fish, 1-16-10 Shin-Yamashita, Naka-ku,
Yokohama 231, Japan. (045-622-8892). (3) JAP
- Norelli, J. L., Department of Plant Pathology, N.Y. State
Agric. Expt. Station, Geneva, NY 14456. (315-787-2317) (1) USA
- Noval, Cristina, Subdirección General de Sanidad Vegetal,
C/Juan Inst. Nacional de Investig. Agrarias, Bravo, 3-B
1ª planta, 28006 Madrid, Spain. (401-30-28) (3) SPN
- Nuncio, O., Apartado Postal 576, Saltillo, Coah., Mexico (2) MEX
- Oberhofer, H., Südtiroler Beratungsring für Obst und Weinbau,
A. Hoferstrasse 9, 39011 Lana, Südtirol, Italy. (3) ITA
- Oktem, Y.E., Ziraat Mücadele Araştırma Enstitüsü, Fatih Cad.,
No. 37, Kalaba (Ankara), Turkey. (3) TUR
- Opgenorth, D. C., Department of Plant Pathology, Univ. of
California, Riverside, CA 92507. (714-787-4119) (2) USA
- Otterbacher, A., University of Illinois, 105 Horticulture
Field Laboratory, Urbana, IL 61801. (217-333-1520) (2) USA
- Palacios, C.J., Camp. Agrícola Experimental "Valle de Juárez",
Apdo. Postal 2244, Praxedis, Guerrero, C.P. 32300, Ciudad
Juárez (Chih.), Mexico. (91-161-33036) (1) MEX

- | | | |
|--|-----|-----|
| <u>Palazon</u> , I., Departamento de Proteccion Vegetal, Centro de Investigaciones y Desarrollo Agrario del Ebro, Apartado 727, 60080 Zaragoza, Spain. (76-709311) | (3) | SPN |
| Panagopoulos, C. G., Laboratory of Phytopath., Athens College of Agric. Sciences, Votanikos, 11855 Athens, Greece. (01-3468-437) | (2) | GRC |
| <u>Panic</u> , M, Dept. of Plant Path., Faculty of Agric., Univ. of Belgrade, Nemanjina 6, 11080 Belgrade (Zemun), Yugoslavia. (30-3301) | (3) | YUG |
| Pashiardis, S., Meteorological Service, Nicosia, Cyprus. | (1) | CYP |
| <u>Paulin</u> , J. P., Station de Phytobact. I.N.R.A., Route de St. Clement, Beaucouze, 49000 Angers, France. (41-73-51-44) | (1) | FR |
| Pecknold, P. C., Dept. of Botany & Plant Path., Purdue Univ. West Lafayette, IN 47907. (317-494-4628). | (1) | USA |
| Persiel, F., Bundesforschungsanstalt fur Gartenbauliche Pflanzenzuchtung, Bornkampsweg, 2070 Ahrensburg, West Germany. (04102-51122) | (1) | BRD |
| Persson, Paula, Dept. of Plant and Forest Protection, Swedish Univ. of Agric. Sciences, P.O. Box 7044, 75007 Uppsala, Sweden (018-67.10.00) | (2) | SWD |
| Porreye, W., Research Station of Gorsem, Brede Akker 3, 3800 Sint-Truiden, Belgium. (011-682019) | (1) | BLG |
| <u>Preiser</u> , F., Research Laboratories, Merck and Company, Inc., Bldg. R123-12, Rahway, NJ 07065. (201-574-6687) | (2) | USA |
| <u>Psallidas</u> , P. G., Benaki Phytopathological Institute, 8 Delta Str., 14561 Kiffissia, Athens, Greece. (01-8078832) | (1) | GRC |
| Pscheidt, J.W., Dept. of Botany & Plant Path., Plant Clinic, Cordley Hall 1089, Oregon State Univ., Corvallis, OR 97331-2903 (503-754-3472). | (2) | USA |
| Rackham, R. L., Benton County Extension Service, 2720 N.W. Polk Street, Corvallis, OR 97330. (503-776-7371) | (1) | USA |
| Raukovic, M., Fruit Research Institute, 32000 Cacak, Yugoslavia. (032-47-411) | (3) | YUG |
| Richiteanu, A., Trustul Pomiculturii, 0300 Pitesti-Maracineni, Romania. (916-32066) | (3) | ROM |
| <u>Pies</u> , S. M., Department of Plant Path., Univ. of Illinois, N-427 Turner Hall, 1102 S. Goodwin, Urbana, IL 61820. (217-333-1523) | (2) | USA |

- Ristevski, B., Fruit Research Station, Faculty of Agric., (3) YUG
91000 Skopje, Yugoslavia. (091-230-557)
- Ritchie, D. F., Department of Plant Pathology, N. C. (2) USA
State Univ., Raleigh, NC 27695. (919-737-2721)
- Roberson, J., Pfizer Inc., Bio-Ag Products, 1370 Valley View Rd. (2) USA
Dunwoody, GA 30338. (404-393-2175).
- Roberts, I., Dept. of Microbiology, Univ. of Leicester, (1) UK
Leicester, LE1 7RH, England.
- Roberts, R., USDA, Tree Fruit Research Lab, 1104 N. Western Ave. (1) USA
Wenatchee, WA 98801 (509-664-2280).
- Rom, R. C., Dept. of Hortic., Room 316, Plant Science Bldg., (2) USA
Univ. of Arkansas, Fayetteville, AR 72701. (501-575-2603)
- Rosenberger, D. A., New York Agric. Exp. Station, Hudson Valley (2) USA
Lab, P.O. Box 727, Highland, NY 12528-0727. (914-691-7151)
- Rousselle, G. L., Agriculture Canada, Sen. Herve J. Michaud (2) CND
Expt. Farm, Bouctouche, New Brunswick EOA 1G0, Canada.
(506-743-2464)
- Rowson, G. R., Farms Div., Showerings Ltd., Woolston, North (1) UK
Cadbury, Yeovil, Somerset, BA22 7BL, England. (0963-40166)
- Rudolph, K., Institut fur Pflanzenpath. und Pflanzensch., (2) BRD
Grisebachstr. 6, 3400 Gottingen, West Germany. (393721)
- Saad, A.T., Dept. of Plant Path., School of Agric., Amer. Univ. (2) LBN
of Beirut, P.O. Box 11-0236, Beirut, Lebanon.
- Sampson, P. J., Department of Agriculture, G.P.O. Box 192B, (3) AUS
Hobart, Tasmania 7001, Australia (002-284851).
- Sanchezmonge, E., Departamento Genetica, Estac. Agronomos, (3) SPN
Ciudad Universitaria, Madrid 3, Spain.
- Sands, D. C., Dept. of Plant Path., Montana State Univ., (2) USA
Bozeman, MT 59717. (406-994-4832)
- Sawatzky, R., Dept. of Hortic. Science, Univ. of Saskatchewan, (1) CND
Saskatoon, Sask. S7N 0W0, Canada. (306-343-4241)
- Schafer, T.W., Agri-Shield, Inc., Suite 430, 3850, Holcomb (1) USA
Bridge Rd., Norcross, GA 30092. (404-368-8398).
- Scheer, H. A. T. van der, Research Station for Fruit (2) NL
Growing, Brugstraat 51, 4475 AN Wilhelminadorp,
The Netherlands. (01100-16390)
- Schouten, H. J., Dept. of Phytopath., Agric. Univ., Binnenhaven (1) NL
9, 6709 PD Wageningen, The Netherlands (08370-83404)

- Schroth, M. N., Department of Plant Pathology, Univ. of California, Berkeley, CA 94720. (415-642-4147) (1) USA
- Schulz, F. A., Dept. of Phytomedizin, Tech. Univ. Berlin, Lentzeallee 55-57, 1000 Berlin, West Germany. (030-31471175) (1) BRD
- Seem, R. C., Department of Plant Path., N.Y. State Agric. Expt. Station, P. O. Box 462, Geneva, NY 14456. (315-787-2366) (2) USA
- Severin, V., Laboratory of Phytobacteriology, Research Inst. for Plant Protection, Blvd. Ion Ionescu de la Brad 8, Bucharest-Baneasa, Romania. (33.58.58-50) (3) ROM
- Shabi, E., Division of Plant Pathology, Agricultural Research Organization, Volcani Centre, P.O. Box 6, Bet Dagan 50250, Israel (972-03.968.3535) (1) ISR
- Sharma, V. P., Dept. of Plant Pathology, Haryana Agric. University, Hissar 125004, India (3) IND
- Sholberg, P. Agriculture Canada, Research Station, Summerland, Brit. Columb. VCH 1Z0 Canada. (604-494-7711) (1) CND
- Sigee, A.C., Dept. of Cell and Structural Biol., Manchester Univ, Stopford Bldg., Manchester M13 9PT, England. (061-275.3906) (2) UK
- Simon, Erzsebet. Plant Quarantine Laboratory, Plant Protection and Agrochemical Station, P.O. Box 99, 6801 Hodmezovasarhely, Hungary. (06-64/11-677) (3) HUN
- Simonsen, J., State Experimental Station, Laasbyvej 18, 8660 Skanderborg, Denmark. (06-520877) (2) DK
- Singh, B. P., USDA, APHIS, Federal Center Bldg., Room 627, 6505 Belcrest Rd., Hyattsville, MD 20782. (301-436-5215) (2) USA
- Slack, D., Dept. of Plant Pathology, Univ. of Arkansas, Fayetteville, AR 72701. (501-575-2446) (1) USA
- Slavov, N., Fruit Growing Institute, 12 Ostromila, Plovdiv 4004, Bulgaria. (3) BUL
- Sletten, A., Dept. of Plant Pathology, Norwegian Plant Protection Institute, Box 70, 1432 AS-NLH, Norway. (2) NOR
- Smith, A. R. W., School of Biolog. Sciences and Environm. Health, Thames Polytech., Wellington Street, London SE18 6PF, England. (01-854-2030 ex. 264). (1) UK
- Smith, I.N., European and Mediter. Plant Protect. Organ., 1 rue Le Notre, 75016 Paris, France. (1-45-20-77-94) (2) FR
- Smith, T.J., Chelan-Douglas Extension, 400 Washington, Wenatchee, WA 98801. (509-663-1121) (2) USA

- Sobiczewski, P., Research Institute of Pomology, ul. (1) POL
Pomologiczna 18, 96-100 Skierniewice, Poland. (Skier. 34-21)
- Spotts, R. A., Mid-Columbia Expt. Station, 3005 Expt. (2) USA
Station Drive, Hood River, OR 97031. (503-386-2030)
- Stead, D., Min. Agric., Fish, and Food, Harpenden Laboratory (1) UK
Hatching Green, Harpenden, Herts AL5 2BD England. (5241).
- Steiner, P., Department of Botany, University of Maryland, (2) USA
College Park, MD 20742. (301-454-0202)
- Stino, G. R., Dept. of Horticulture, Faculty of (2) EGY
Agriculture, Cairo University, Giza (Cairo), Egypt.
- Sugar, D., Southern Oregon Expt. Station, 569 Hanley Rd., (2) USA
Medford, OR 97502. (503-772-5165)
- Sumida, T., Pesticides Devel. Div., Sumitomo Chem. America, Inc. (2) USA
345 Park Ave., New York, NY 10154. (212-207-0600).
- Suta, Victoria, Research Institute for Fruit Growing, (3) ROM
0300 Pitesti-Maracineni, Romania. (976-34292)
- Sutton, T. B., Department of Plant Pathology, N.C. (1) USA
State Univ., Raleigh, NC 27695-7616. (919-737-2752)
- Swanson, B. T., Dept. of Horticulture, 356 Alderman Hall, (1) USA
Univ. of Minnesota, St. Paul, MN 55108. (612-373-1011)
- Taylor, D., Ministry of Agric., Fish, and Food, National Fruit (1) UK
Trials, Brogdale Exp. Hort. Station, Faversham, Kent ME13
8XZ, England. (079582-5462/3/4).
- Teylingen, M. van, Plant Protection Service, Geertjesweg 15, (2) NL
P.O. Box 9102, 6700 HC Wageningen, The Netherlands.
(8370-96522)
- Thibault, B., Station d'Arboriculture Fruitiere, I.N.R.A., (4) FR
Route de St. Clement, Beaucouze, 49000 Angers, France.
(44-73-51.08)
- Thompson, J. M., Route 2, Box 2993, Blairsville, GA 30512. (4) USA
(404-745-3558)
- Thomson, S. V., Department of Biology, UMC 53, Utah State Univ., (1) USA
Logan, UT 84322-5305. (801-753-0075)
- Timmermans, Y., Lab. de Phytopathologie, Centre d'Etudes de (1) BLG
Phytophosphores, 3 Place Croix du Sud, Sci. 15 D, 1348
Louvain-La-Neuve, Belgium. (010-433755)
- Travis, J. A., Department of Plant Pathology, Penn State (2) USA
University, Buckhart Lab., University Park, PA 16802.

Tsiantos, J., Plant Protection Inst., Volos, Greece. (0421-60601)	(2)	GRC
United States Department of Agriculture, Nat. Agric. Library, Serials Unit, Room 002, VC-88549, Agric. Res. Center Beltsville, MD 20705.	(2)	USA
van Buskirk, P.D., Jackson County Extension Service 1301 Maple Grove Drive, Medford, OR 97501 (503-776-7381).	(1)	USA
Vereecke, M., Commission of the Europ. Communities, DG VI-B.II.1, Rue de la Loi 130, 1040 Brussels, Belgium. (02-23.63.260)	(1)	BLG
<u>Vidal</u> , R., Casilla 12, Teno, Chili. (75-411105).	(3)	CHL
Viseur, J., Centre de Lutte Integree en Phytopathologie, I.R.S.I.A., Avenue Marechal Juin 13, 5800 Gembloux, Belgium. (081-61.01.26)	(1)	BLG
Vogelsanger, D., Pflanzenschutzamt, Hermannswerder 20A, 15 Potsdam, East Germany.	(2)	DDR
Vondracek, J., Fruit Research Station, Techobuzize, 411 42 Ploskovic (okr. Litomerice), Czechoslovakia. (Ploskovic 9387)	(2)	CZE
<u>Voronkova</u> , L., Dept. of Bacteriology, Central Laboratory for Plant Quarantine, 1/11 Orlikov per., 107139 Moscow, B-139, Russia.	(3)	RUS
Vuurde, J. W. L. van, Research Institute for Plant Protect., Binnenhaven 12, P.O. Box 9060, 6700 GW Wageningen, The Netherlands. (08370-19151)	(1)	NL
<u>Wade</u> , E. K., Department of Plant Pathology, University of Wisconsin, Madison, WI 53706. (608-262-1426)	(2)	USA
<u>Walsh</u> , P. F., Dent. of Agriculture, Agriculture House, Kildare St., Dublin 2, Ireland. (789011, est. 2089)	(2)	IRL
Willetts, M., Yakima Co. Coop. Ext. Serv., 233 Courthouse, Yakima, WA 98901. (509-575-4242)	(2)	USA
Wimalajeewa, S., Plant Research Institute, Burnley Gardens, Swan Street, Burnley, Victoria 3121, Australia. (8101511)	(3)	AUS
Wodzinski, R. S., Biology Department, Ithaca College, Ithaca, NY 14850. (607-274-3979)	(1)	USA
<u>Yoder</u> , K. S., Fruit Research Lab., Va. Polytech. Inst., 2500 Valley Ave., Winchester, VA 22601. (703-667-8330)	(1)	USA
Yorston, Y. M., Brit. Columb. Ministry of Agric., 1873 Spall Rd., Kelowna, BC V1Y 4R2, Canada. (604-861-7211)	(2)	CND

- Young, Debra, Arizona Coop. Extension Serv., 450 S. Haskell, (2) USA
Willcox, AZ 85643. (602-384-3594)
- Young, T.R., Ciba-Geigy Corp, P.O. Box 32961-1090, (1) USA
Vero Beach, FL 32967. (305-567-5218).
- Zehr, E. I., Department of Plant Pathology & Physiology, (2) USA
Clemson University, Clemson, SC 29631. (803-656-3450)
- Zeller, W., Biologische Bundesanstalt fur Land und (1) BRD
Forstwirtschaft, Institut fur Pflanzenschutz,
Schwabenheimerstrasse, Postfach 73,
6901 Dossenheim/Heidelberg, West Germany. (06221-85238)
- Zhang, Z, Dept. of Phytopathology, Inst. of Plant Quarantine, (3) CHI
Min. of Agric., Anim. Husb. and Fish, Beijing, China (PRC)
100026. (594843)
- Zoller, B.G., The Pear Doctor, Inc., P.O. Box 952, (2) USA
Yuba City, CA 95992. (916-674-1255).
- Zwet, T. van der, U.S. Department of Agriculture, (1) USA
Appalachian Fruit Research Station, 45 Wiltshire Road,
Kearneysville, WV 25430. (304-725-3451, ext. 329)

Working Group Membership by Country 1/

<u>Argentina</u>	Bergna, D. A. *Meyer, F.C.	Sampson, P.J.
<u>Australia</u>	*Cartwright, D. N. Fahy, D. C.	Ikin, R. Wimalajeewa, S.
<u>Austria</u>	*Keck, M.	
<u>Belgium</u>	*Deckers, T. De Ley, J. Geenen, J. Laere O. van Maroquin, C.	Porreys, W. Timmermans, Y. Vereecke, M. Viseur, J.
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<u>Canada</u>	AGR. CAN. LIBRARY Biggs, A. R. *Bonn, W. G. *Braun, P.G. Cline, R.A. Coulombe, L.J. Davidson, J.G.N. *Evans, I.R. Howard, R.J.	Hunter, C.L. Lethal, J. McPhee, R. Muir, J. *Rousselle, G.L. *Sawatzky, R. *Sholberg, P. Yorston, Y.M.
<u>Chile</u>	del Solar, C.E. *Vidal, R.	-
<u>China (P.R.)</u>	Cao, R. *Zhang, Z.	
<u>Cyprus</u>	*Dimova, M. Pashiardis, S.	
<u>Czechoslovakia</u>	*Kudela, V. Vondracek, J.	
<u>Denmark</u>	Christensen, F.G. *Dinesen, G. Mikkelsen E.	Mosegaard, J. Simonsen, J.
<u>East Germany (DDR)</u>	*Kleinhempel, H. Vogelsanger, D.	
<u>Egypt</u>	*Abo-El-Dahab, M. K. El-Kazzaz, M. K. El-Saïd, S.	El-Zayat, M.M. Stino, G.R.

1/ Names with asterisk (*) are contact persons.

<u>England (U. K.)</u>	Alston, F. H. Billing, E. Blakeman, J. P. Byrde, R.J.W. Cooper, R.M.. Ebbels, D.L. Epton, H.A.S. Evans, E.G. Fox, R.T.V. *Garrett, C.M.E.	Hignett, R.C. Jones, D.R. Mansfield, J.W. Milner, J.S. Roberts, I. Rowson, G.R. Sigee, A.C. Smith, A.R.W. Stead, D. Taylor, D.
<u>France</u>	Balavoine, P. Cadic, A. Chevalier R. Larue, P. Lecomte, P.	Michon, P. *Paulin, J.P. Smith, I. Thibault, B.
<u>Greece</u>	Manganaris, A. Panagopoulos, C. G.	*Psallidas, P.G. Tsiantos, J.
<u>Hungary</u>	Klement, Z. *Simon, E.	
<u>India</u>	Gupta, V. K. Sharma, V. P.	
<u>Ireland</u>	*Walsh, P.	
<u>Israel</u>	*Shabi, E.	
<u>Italy</u>	*Bazzi, C. Calzolari, A. Ercolani, G. Fideghelli, C.	Mazzucchi, E. Oberhofer, H.
<u>Japan</u>	*Fujita, K. Nishio, T.	Kato, T.
<u>Lebanon</u>	*Saad, A.T.	
<u>Mexico</u>	*Fucikovsky, L. Mendoza, H.A.	Nuncio, O. Palacios, C.J.
<u>Morocco</u>	*Chouibani, M.	
<u>Netherlands</u>	Bouma, S. Heybroek, H.M. Janse, J.D. Kooistra, T. Meijneke, C.A.R.	PUDOC Scheer, H.A.T. van der Schouten, H.J. *Teylingen, M. van Vuurde, J.W.L. van
<u>New Zealand</u>	Drewitt, W. *Hale, C. N.	

<u>Norway</u>	Dale, T. *Sletten, A.	
<u>Poland</u>	Burkowicz, A. *Sobiczewski, P.	
<u>Portugal</u>	Lopes Barardo, R. *Martins, J.M.S.	
<u>Romania</u>	Richiteanu, A. Severin, V.	*Suta, V.
<u>Russia (USSR)</u>	*Voronkova, L.	
<u>South Africa</u>	*Hattingh, M.J.	
<u>Spain</u>	Carrera, M. Lopez Gonzales, M. Mansergas, A.J.F.	Noval, C. *Palazon, I. Sanchezmonge, E.
<u>Sweden</u>	*Karlton, M. Kroeker, G.	Persson, P.
<u>Switzerland</u>	Bolay, A. Cazelles, O.	*Grimm, R. Joseph, E.
<u>Taiwan</u>	*Linn, C.P.	
<u>Turkey</u>	Baykal, N. *Oktem, Y.E.	
<u>West Germany (FRG)</u>	Dalchow, J. Geider, K. Gessner, E. Graf, H. Knosel, D. Krebs, E.K. Lehmann-Danzinger, H. Lux-Wellenhof, E.	Mappes, D. Massfeller, D. Meyer, J. Michel, H.G. Persiel, F. Rudolph, K. Schulz, F.A. *Zeller, W.
<u>Yugoslavia</u>	Arsenijevic, M. *Panic, M.	Raukovic, M. Ristevski, B.

UNITED STATES

Aldwinckle, H. S.	Rackman, R.L.
Bates, J.J.	*Ries, S.M.
*Beer, S.V.	*Ritchie, D.F.
Bell, R.L.	Roberson, J.
Beutel J. A.	Roberts, R.
Bushong, J.W.	Rom, R.C.
Civerolo, E.L.	Rosenberger, D.A.
*Covey, R.P.	Sands, D.C.
Cummins, J.N.	Schafer, T.W.
*Douglas, S.M.	Schroth, M.N.
Egolf, D.R.	Seem, R.C.
*Ellis, M.A.	Singh, B.P.
French, J.R.	*Slack, D.
Gantotti, B.V.	Smith, T.J.
*Goodman, R.N.	Spotts, B.P.
*Hickey, K.D.	*Steiner, P.
Hummer, K.	*Sugar, D.
*Janick, J.	Sumida, T.
*Jones, A.L.	Sutton, T.B.
Joshi, M.M.	Swanson, B.T.
Kado, G.I.	*Thompson, J.M.
Koenigshof, R.	*Thomson, S.V.
Lamb, R.C.	Travis, J.A.
Landis, W.	USDA Library
Lindow, S.	Van Buskirk, P.D.
Lombard, P.	*Wade, E.K.
Luby, J.	Willett, M.
Mielke, G.	Wodzinski, R.S.
*Miller, R.W.	*Yoder, K.S.
Morton, H.V.	*Young, D.
Norelli, J.L.	Young, T.R.
Opgenorth, D.	Zehr, E.I.
Otterbacker, A.	*Zoller, B.G.
Pecknold, P.C.	*Zwet, T. van der
*Preiser, F.	
Pscheidt, J.W.	

SUMMARYContact Persons for Fire Blight Newsletter

<u>United States</u>		<u>Other Countries</u>	
Arizona	Young, D.	Argentina	Meyer, F.C.
Arkansas	Slack, D.	Australia	Cartwright, D.N.
California	Zoller, B. G.	Austria	Keck, M.
Connecticut	Douglas, S. M.	Belgium	Deckers, T.
Georgia	Thompson, J. M.	Chili	Vidal, R.
Illinois	Ries, S. M.	China (P.R.)	Zhang, Z.
Indiana	Janick, J.	Cyprus	Dimova, M.
Maryland	Steiner, P.	Czechoslovakia	Kudela, V.
Michigan	Jones, A. L.	Denmark	Dinesen, A.
Missouri	Goodman, R.N.	Egypt	Abo-El-Dahab, M.K.
New Jersey	Preiser, F.	England	Garrett, C. M.E.
New York	Beer, S.V.	France	Paulin, J. P.
North Carolina	Ritchie, D.F.	Germany (East)	Kleinhempel, H.
Ohio	Ellis, M.A.	Germany (West)	Zeller, W.
Oregon	Sugar, D.	Greece	Psallidas, P. G.
Pennsylvania	Hickey, K.D.	Hungary	Simon, E.
South Carolina	Miller, R.W.	Ireland	Walsh, P.
Utah	Thomson, S.V.	Israel	Shabi, E.
Virginia	Yoder, K.S.	Italy	Bazzi, C.
Washington	Covey, R.P.	Japan	Fujita, K.
West Virginia	van der Zwet, T.	Lebanon	Saad, A.T.
Wisconsin	Wade, E.K.	Mexico	Fucikovsky, L.
		Morocco	Chouibani, M.
		Netherlands	van Teylingen, M.
		New Zealand	Hale, C.N.
		Norway	Sletten, A.
		Poland	Sobiczewski, P.
		Portugal	Martins, J.M.S.
		Romania	Suta, V.
		Russia	Voronkova, L.
		South Africa	Hattingh, M.J.
		Spain	Palazon, I.
		Sweden	Karltorp, M.
		Switzerland	Grimm, R.
<u>Canada</u>			
Alberta	Evans, I.R.		
British Columbia	Sholberg, P.		
New Brunswick	Rousselle, G.L.		
Nova Scotia	Braun, P.J.		
Ontario	Bonn, W.G.		
Saskatchewan	Sawatzky, R.		
Taiwan	Lin, C.F.		
Turkey	Oktem, Y.E.		
Yugoslavia	Panic, M.		

SUMMARY
Persons Interested in Fire Blight

Country	Interest Category				Total	Number of Contact Persons
	1	2	3	4		
* USA - United States	30	39		1	70	22
* CND - Canada	3	14			17	6
* UK - England	13	5		2	20	1
* BRD - West Germany	10	6	2		16	1
* NL - Netherlands	6	3		1	10	1
* BLG - Belgium	7	2			9	1
* FR - France	4	4		1	9	1
* DK - Denmark		5			5	1
* EGY - Egypt	1	4			5	1
* MEX - Mexico	2	2			4	1
* GRC - Greece	1	3			4	1
* SWD - Sweden		3			3	1
* NZ - New Zealand	1	1			2	1
* DDR - East Germany	1	1			2	1
* POL - Poland	1	1			2	1
* NOR - Norway		2			2	1
* CYP - Cyprus	1	1			2	1
* CZE - Czechoslovakia	1	1			2	1
* IRL - Ireland		1			1	1
* ISR - Israel	1				1	1
* LEB - Lebanon		1			1	1
* LUX - Luxemburg		1			1	1
ITA - Italy			6		6	1
SPN - Spain			6		6	1
AUS - Australia			5		5	1
SWT - Switzerland			4		4	1
YUG - Yugoslavia			4		4	1
JAP - Japan			3		3	1
ROM - Romania			3		3	1
HUN - Hungary			2		2	1
ARG - Argentina			2		2	1
POR - Portugal			2		2	1
CHI - China			2		2	1
TUR - Turkey			2		2	1
CHL - Chili			2		2	1
SA - South Africa			1		1	1
MOR - Morocco			1		1	1
OST - Austria			1		1	1
RUS - Russia			1		1	1
TAW - Taiwan			1		1	1
BUL - Bulgaria			1		1	1
IND - India			2		2	
TOTAL	83	99	51	5	238	65

* Countries with fire blight.

